did not recover, although there had been a temporary diminution in the number of organisms. The drug is not without deleterious side effects. It may depress bone-marrow function and reduce the activity of leukocytes. It causes sulfhemoglobinemia evidenced by severe cyanosis. In one case 6 grams of the 15 grams of hemoglobin per 100 cubic centimeters of blood (about 40 per cent) was so converted. The patient had a ghastly aspect for several days after the drug was discontinued.

In some communities, and in some epidemics, streptococcic pneumonias may be of great importance. Pneumonias may be induced by Streptococcus alpha or Streptococcus beta, but very rarely by Streptococcus gamma. The pneumonias due to Streptococcus alpha have been either very mild or have induced empyema. In one patient a brain abscess developed. Pneumonia due to Streptococcus beta may be due to one of the twenty-seven different types of Griffith. Where the types which cause scarlet fever are present, convalescent scarlet fever serum has induced a critical termination. This serum did not, however, prevent development of empyema. The streptococcic pneumonias cause early pleural effusion. We have also had excellent results in pneumonias due to Streptococcus hemolyticus from an adequate administration of sulfanilamid, especially in those cases where an organism has been recovered by lung suction, and the blood culture has been sterile.

IN CONCLUSION

Unfortunately the precise diagnosis of pneumonia, including the type, may not be made until several days have elapsed. Under such conditions, much larger doses of serum must be employed, and opportunity for marked disturbances in metabolism and destruction of necessary body ingredients have occurred.

A thorough knowledge of physiology and pharmacology is required for the treatment of pneumonia. There is no disease where the emergencies are more sudden and more menacing. Because of the consolidation of the lungs, ability to absorb oxygen is restricted. The oxygen deficiency leads to changes in the circulation and the nutrition of the brain, so that restlessness and delirium are frequent. In addition, through the skin and gastrointestinal tract there may be marked losses of water and salt, and exhaustion of hormones leading to loss of tissue turgor. On this account there must be a careful selection of sedatives, while extreme vigilance is exercised in nursing and feeding.

SUMMARY

The management of the pneumonias depends upon etiologic differentiation, and a serotherapy is available which saves lives and shortens illnesses. Serotherapy and chemotherapy are available for the Streptococcus beta. The principles involved in serotherapy and chemotherapy are indicated.

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THE PRACTICE OF PEDIATRICS AS A SPECIALTY*

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THE pioneers of pediatrics, a small and scattered group, are only the immediate predecessors of most of us who comprise the second group in this specialty. Ours is a young specialty, and in our generation we have been enabled to observe a great part of its development and definition, many things which constitute the chief activities of the present-day pediatrician, have been developed during this time.

Pediatrics is a direct outgrowth, or at least a concomitant development, of a new idea in intensive puericulture. The old scheme of rearing children was based on the sound biologic law of the survival of the fittest. Children were produced in abundance and an effort was made to supply them with their needs for subsistence but they thrived or not, survived or not, largely dependent on their own inherent powers in the struggle for existence. This older method is biologically sound but economically not so tenable. Thereby was produced a hardy race of survivors, a certain percentage of cripples, and many of the weaker were removed by natural processes.

The modern method is based on a desire for smaller families, accomplished by methods of birth control, with the idea of giving every individual maximum opportunity for obtaining his best possible degree of development—physically, mentally, and culturally. During the last two or three decades the average span of life has been materially lengthened; this result has largely been secured through improvement of health and nutrition during the early years of life. The ultimate result of the improved care of childhood on the physical status of later life is still to be demonstrated but it is not unlikely that there will be unpredictable remote effects in the later years of future generations as the result of such an extensive biologic experiment. Not long ago the chief problems of child health were the product of scarcity of certain essentials, our generation has created some new problems of superabundance.

Formerly most children were born at home—as a matter of fact were delivered sight unseen beneath the bedcovers. This resulted in poor obstetrics and primitive asepsis but only the fittest were expected to survive and asepsis was not nearly so important as later when cases were crowded into hospitals. The mother nursed her baby as a matter of course. As long as she had sufficient milk she needed very little help with the nutrition of her baby and gradually maternal nursing was supplemented by casual additions from the family table. Of course, if the mother's milk supply was inadequate the problem of artificial feeding was extremely complicated and hazardous, and infant mortality in these cases was appallingly high.

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The babies which comprise your practice and mine are delivered in hospitals. Modern obstetrics and better prenatal and postnatal care have led to a great diminution in the hazards of very early life. The obstetricians learned their lessons in the prevention of infection from Semmelweiss and Oliver Wendell Holmes and similar lessons have had to be learned by the pediatrician in the care of infants in the socialized atmosphere of the nursery. A curious by-product of this system has been, however, a marked decrease in breast feeding. In most mammals, including until the last few years the human being, the young are nursed almost incessantly during the first few days of life. Gradually, as the milk supply becomes established, a more convenient schedule is established. This procedure fits poorly with hospital routine. The hospital baby is nursed most infrequently during the first few days and is then generally put upon a final schedule of widely spaced nursings. This results poorly in the establishment of adequate milk supply. Meanwhile the baby is subjected to repeated weighings and there is great and perhaps unnatural concern about his weight increment. Almost inevitably the baby is placed partly or entirely on artificial food somewhere between the first hour and the first week of life. This is entirely inimical to the natural method of feeding an infant; it is not necessarily bad, but it is distinctly abnormal. Quantitatively, of course, the nutrition of the infant is thus improved but qualitatively there is the possibility of far-reaching effects. Colostrum has some effect on the bodily economy of the new-born. Does its absence adversely affect the immunologic status of the individual? The introduction of foreign protein into the digestive tract of the infant is not well borne by most animals and is not always well tolerated by the human being. I cannot help wondering if the apparent tremendous increase in allergy can be thus explained. San Francisco should be an ideal laboratory in which to test this hypothesis. The effect of interference with maternal nursing cannot readily be evaluated; one must reflect on the results of this on the mother both physically and emotionally. The muscular effort of nursing the breast differs entirely from that of taking the bottle, the former requiring an amount of muscular activity of the jaws at variance with their rôle in the latter which almost certainly affects the development of the baby's jaws and teeth. Many of the defects of dental occlusion, currently attributed to thumb-sucking and the use of soft food are thus more rationally explained. Pediatrics must face all of the possible effects of substitution of the artificial for the physiological. It is unlikely that the artificial can preferably supplant the physiologic; proof in support of this will require far more observation than is at our present command. It is, further, most unlikely that a profound biologic change in the mother has suddenly, in one generation, rendered so many unable to nourish their infants.

Nearly every authoritative treatise on infant feeding begins with the precept that breast milk is the best food for the infant. So explicit is this dictum that, rather surprisingly, the manufacturers of artificial food use it as a slogan—with, of course, the implication that theirs is the next best food. If this be true and not idle pious platitude the pediatrician would do well to adopt a program better fitted for its accomplishment. Infant feeding has become so simple as not to require extreme skill—the superior qualifications of the specialist might much better be devoted to the more difficult problem of breast feeding if it is not heresy to advocate it. Our grandmothers, who nursed their babies because they usually otherwise would die, nursed them frequently at first and never gave artificial food until it was an absolute necessity, followed, in my opinion, a program much more likely to achieve this result than is brought about by prelacteal feeding, supplementary feeding with cow's milk, and frequent early abandonment of breast feeding.

Our knowledge of artificial feeding has meanwhile perforce greatly improved. Our knowledge of the quantitative requirements of an infant has especially progressed but knowledge regarding the qualitative requirements has not progressed so rapidly. Undoubtedly, the greatest improvement in the mortality rate of artificially fed infants has resulted from the production of uncontaminated milk and the application of aseptic methods to the preparation of a formula. The qualitative adaptation of cow's milk to the infant's nutrition has not been nearly so well perfected as the principle of giving the baby enough to eat. Mother's milk contains all of the food factors essential to nutrition; cow's milk, especially when it has been heated to destroy pathogenic bacteria and for preservation, does not. Improved knowledge regarding accessory food substances, the vitamins, has gradually improved to reach what we may trust to be a climax at the present time. Gradually vitamins A, B, C, D, and upward have been added to the infant dietary with increasing enthusiasm. Thereby certain diseases produced by deficiency in these vitamins have been gradually eliminated but at the present time these substances are exhibited with such enthusiasm that one must fear the possible effect of superabundance. This problem is particularly acute in the case of vitamin D which the modern infant receives by way of that naturally present in his food, through artificial reinforcement of the content of the milk, by cod-liver oil, other fish oils, and viosterol, and by solar radiation. In all probability the organism is capable of rejecting an excess but we must at least consider the possibility of adverse effects of overdosage. These effects may not be apparent in the first few years of life and may not sufficiently be demonstrated by a single generation of experience. It is unlikely that many children have been overdosed with synthetic vitamins but it is sincerely to be hoped that there will be nothing in the future to reproach present over-enthusiasm.

In the feeding of children past early infancy, pediatrics has gone through several phases. With

improved knowledge of the quantitative requirements of the infant and child we early began to set up a strict standard of nutrition which was indiscriminately applied. For a few years mothers thrust down unwilling throats the exact amount of food prescribed for the child and the scales assumed unnatural importance in evaluating the child's nutrition. This led to a rather curious psychological problem which developed in both mother and child, and led to the absurd problem of the child who will not eat which has been discussed by most pediatricians and all psychologists. In spite of the pediatrician who said that he built his house with the child who will not eat, modern pediatrics has come to recognize that this is a problem which does not naturally exist, but is only an unfortunate by-product of an unnatural system of feeding. We have gradually come to a recognition of the fact that the nutrition of a child must be individually judged. Some are large, some are small, some are fat, some are thin. Every pediatrician should hang above his scales the poem of the little elf man, "I am just as big for me, said he, as you are big for you." The dietary components for the child have been altered materially in the last few years. Not so long ago children received solid food during the first year, mostly surreptitiously. Then came the period when children were given, long after the appearance of their teeth, only soft, sloppy foods and some children never did really learn to chew. More recently solids of almost every kind and of increasing solidity have been added to the diet at earlier and earlier time to a present almost unnatural extreme. The incorporation of vitamin components in the diet of older children has also been carried to ridiculous extremes.

The influence of scientific advance is to be seen not only in the field of nutrition in this matter of intensive puericulture. Past infancy the child is receiving more scientific attention than in any previous time in the world's history. Most of this effort is, doubtless, on the whole beneficial, and is partly responsible for the tremendous improvement in nutrition, stature, and general well-being of our present-day children. But pediatrics must not attempt to gild the lily, the purpose of periodic health examinations is to maintain a state of health in the individual, and not to elevate him to a state of supernutrition. It is the wise pediatrician who can counsel the mother without providing her a complete substitute for her own common sense and maternal devotion. It will be well if the phrase, "the triumph of technique over reason" which has been leveled at some other specialties, can never properly be flung at pediatrics.

The energetic application of specific immunization in communicable diseases has been an outstanding development of modern pediatrics. The prevention of smallpox rests on a century of experience which demonstrates its usefulness, effectiveness, and safety most convincingly. During the past thirty years, experience has demonstrated that diphtheria can be prevented by a method which is not directly analogous to smallpox vaccination, but which even more thoroughly complies with essential criteria. These methods have engendered an enthusiasm which has led to the introduction of numerous methods designed for the specific prevention of communicable disease. It is utterly essential that before such methods be generally applied there should be adequate evidence regarding the criteria of usefulness, effectiveness, and safety of each individual measure considered solely on the basis of its own merits and not by way of an analogy. One must constantly maintain a critical point of view and must be mindful of the fact that there is a practical limit to the number of such procedures to which a child should be subjected.

Our interest in the well child has not stopped with his physical well-being, the study of child psychology has progressed enormously in the past few years. Surely, no one would wish to deny that this field has contributed much to the rearing and education, to the correction of defects in personality, and to the adaptation of the child to his environment. The greatest danger in this particular sphere is that the intensively reared individual be shaped by many and inexpert hands. The physician, especially the pediatrician, must be adequately grounded psychologically, but no scientific subject has been more popularized and at the same time more obfuscated to both the physician and the public by an intricacy of technique and terminology. Most of the psychological problems of childhood can be handled by most simple methods based on a thorough and sympathetic understanding of the child. The pediatrician who realizes how frequently physical defects are remedied by the natural processes of growth and development must not lose sight of a similar natural mechanism for the correction of psychological defects. The psychological problems of childhood, as pointed out by Brenneman, are seldom static.

Whatever the value of pediatrics to the well child, pediatricians must be equipped to deal even more expertly with the ill child. Almost none of the problems of diagnosis in childhood and only a few therapeutic procedures are beyond the scope of the adequately trained pediatrician. A good definition of a specialist is one who attempts only that which he does expertly. Pediatrics, in contrast to other specialties, restricts itself not to organs, systems, or to kindred diseases but to the particularized study of patients during a restricted age period. The pediatrician must bring to this pursuit certain prerequisites of knowledge which differentiate him from the internist who may be equally familiar with the disease processes themselves. He must be adequately schooled in growth and development, and must properly understand the practical aspects of child psychology, but he must be possessed of no less keen clinical sense than the internist and must, furthermore, combine his scientific qualifications with personal attributes of kindness and gentleness.

The most difficult, as well as the most interesting and important, diseases which fall within the scope of pediatrics, are the communicable diseases. The specialist in pediatrics must be exceedingly well trained in this field, for here come a great many of his emergency problems in which the outcome is greatly influenced by the promptness and accuracy of his diagnosis and treatment.

One of the greatest opportunities in pediatrics is that of clinical research conducted along the methods suggested by Sir James Mackenzie. The child is an ideal subject for the type of accurate and detailed observations necessary for the scientific study of disease and is altogether unrivaled by any experimental animal. In childhood, disease problems usually present themselves as entities unaccompanied by the numerous complicating factors which obscure observations in the adult. The pediatrician sees his patients frequently from birth to adolescence and can trace the beginnings of disease, as well as the modifications brought therein, by growth and development. Here are to be found the recognizable first-infection forms of tuberculosis and rheumatic fever; we should be alert to detect similar first-infection forms of other diseases important to adult life. Some of the most profound problems of modern medicine are more likely to be solved by the pediatrician, if he is sufficiently alert, than by any other specialist.

These clinical problems are numerous, but can be aptly illustrated by one or two examples. In the child is to be observed the interplay of endocrine influences as they affect growth, developmental changes, and the catalysis of sexual maturity. The problems of endocrin deficiency or of superabundance can be observed from their inception, the problem of therapy is thus made far more hopeful, and the opportunity for scientific study is infinitely superior to the static end-result which is presented to the observation of the internist.

Another clinical research in which the pediatrician must maintain interest and in which he has enormous opportunity in the field of his own practice is the problem of allergy, the mysterious mechanism of altered reactivity which is important to almost every field of medicine. Allergic problems which present in later life are extremely complex, in childhood one confronts the problem in its simplest guise. Only the pediatrician has the opportunity to follow the child through years which permit him to observe the modifications brought about by heredity, prenatal state, nutrition, environment, nervous influences, infection, the response to therapy, and the multitude of factors which influence the problem before it reaches the internist later on. I do not believe that there is any greater opportunity presented to the modern pediatrician. One cannot escape the conviction that the accumulated laboratory data lacks only an ingenious clinical approach to open the door to tremendous advances in our knowledge. I am convinced that a continued and truly scientific study of this condition in clinical pediatrics should be far more productive of valuable conclusions than any similar expenditure of energy in older patients or in experimental animals.

It is, I think, unlikely, that the pediatrician will quickly be supplanted by any other type of medical practitioner. The public has been trained to demand intensive care of a restricted output of children. Continued survival of our speciality necessitates, however, that the pediatrician bring to his task highly specialized attributes of training and skill. Artificial feeding of infancy has been so simplified and standardized as no longer to make the greatest demand on this skill. The pediatrician must keep abreast of changing trends and be prepared to meet a multitude of demands in every aspect of child care, nutrition, disease prophylaxis, psychological guidance, and must offer a superior technique in the treatment of the ill child. The scientific advance of this specialty will be greatly served by proper appreciation of the extraordinary opportunities in this field for clinical research.

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PERTINENT COMMENTS ON ANESTHESIA*

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KNOWLEDGE concerning a fact goes through certain phases. These are: Discovery, appreciation, and investigation. Knowledge of anesthesia, being a fact, went through this same process in development.

Anesthetic agents were known many years before their practical application, but at last came the discovery of the fact and their use quickly followed. During the next phase, or that of appreciation, the use of ether became quite universal. It seemed so safe and satisfactory that no great effort was put forth to find anything better.

The "A. A. A." that nurtured modern surgery—anesthesia, antisepsis, and asepsis—never needed a court decision to prove their constitutionality. They were proved beyond a doubt by their benefit to mankind.

However, anesthesia lagged behind in the rapid development of medical and surgical science. Whether due to a false sense of safety or not, the administering of ether was delegated to others who did not have the scientific training of the surgeon. Abroad that was not the case, perhaps because chloroform (which was more popular) was recognized as a dangerous agent when used by the unskilled and, therefore, was never let out of professional hands. During this phase of anesthetic knowledge, surgery made great advances in technical skill and mechanical devices to assist in operations. Also, surgical science was advanced by extension of medical curricula and development of clinics, while a few lectures sufficed to stimulate a

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